93 instead of milepost **92** because of a critical bond to a foreign pipeline at milepost **93**. It then becomes possible to monitor the integrity of this bond in addition to monitoring the status of the cathodic protection circuits **20**. A resistor **126** is placed between the two pipelines **10, 11** to control the amount of current flow and/or to determine how much current is actually passing between the two pipelines **10, 11**.

[**0123**] There are also various leak detection devices **128** that may be attached and buried with the pipeline **10**. Such detection devices **128** may also be monitored and measured.

[**0124**] Referring now to **FIG. 12**, the method and apparatus of the present invention may be used to detect the passage of pigs **130** through the pipeline **10**. Pigs **130** are passed through the pipeline **10** to clean the pipelines and to separate batches of hydrocarbon products. The pig **130** is similar to an elastomeric sphere that is pushed by the product passing through the pipeline **10**. The elastomeric sphere **130** scrapes against the inner surface **132** of the pipeline **10** as it passes through the pipeline **10** thereby cleaning the interior walls **132** of the pipeline **10**. Some pigs **130** are instrumented to measure and record metal loss, dents and other conditions of the pipeline. The remote monitoring units can monitor and track the progress of the pig **130** as it passes through the pipeline **10** so as to sense if the pig **130** becomes stuck. One type of sensor **134** for sensing a pig **130** is a geophone receiver attached to the pipeline **10** to monitor the noise made by the passing of the pig **130** through the pipeline **10**. Other types of sensors **134** are a hydrophone to monitor the noise from the pig **130**. Another is an electromagnetic detector **134** mounted on the pipeline **10** to sense a magnet **136** disposed within the pig **130** to detect the pig **130** as it passes through the pipeline **10** beneath the electromagnetic detector **134**. The monitoring unit might have to be left on for a substantial period of time to detect the passage of a pig **130**.

[**0125**] Referring back to **FIG. 7**, other parameters that can be monitored in combination with a pipe-to-soil potential **74** include, but are not limited to, casing-to-soil potential **77**, pipe current **76**, "sniffing" for hydrocarbons **78** in a casing vent **132**, detection of a pig's passage **80** past a specific critical point (e.g. a valve), monitoring of leak detection devices **79**, and monitoring the output of sacrificial anodes **75**. In addition, the location of the remote monitoring unit may be used as an above ground reference point for smart pigging operations.

[**0126**] It is preferable for the analysis of results from various remote monitoring units to be controlled by special custom software and known set points; the influence from each cathodic protection circuit **20** (exemplified in the Table 1) are programmed in. As a result, the pipeline operator can be alerted of any upset conditions and the software can predict the nature of the upset condition.

[**0127**] In a preferred embodiment, the present invention is multifunctional and capable of remotely monitoring many parameters at any specific location. Because the remote monitoring unit location is not limited to a cathodic protection circuit location (as is the case with conventional rectifier remote monitoring), the proposed methodology allows flexibility in terms of the exact location of the remote monitoring unit.

[**0128**] Referring again to **FIG. 7**, there is shown a schematic of the method and apparatus of the present invention including a communication module **64** and a measurement and control unit **84** receiving power from one or more power sources such as an AC power source **86**, DC power source **87** or a solar panel **92**. Each of these power sources is routed through a charging circuit **90** which controls recharging of battery **88** as previously described. A disconnect assembly **94** serves as a switch to the sensors **70** to **80** and also to AC power **86** or DC power **87** as previously described.

[**0129**] Communication system **138** is used to relay the data from communication module **64** to a central location. The communication system **138** makes it unnecessary to visit each of the remote monitoring units or each of the rectifiers since by knowing the influence from each of the cathodic protection circuits **20** as measured by the remote monitoring units, the status of cathodic protection circuits **20** can be determined from changes in pipe-to-soil potential measured by the remote monitoring unit.

[**0130**] The communication system **138** communicates with a central server **142** at a remote central location. Such communication may occur using a satellite **144**, an analog or digital mobile phone **146**, a land line (not shown), or a radio **148** to transmit the data from the communications module **64** to the server **142**. Any other form of communication capable of transmitting data over significant distances may be used. The communications module **64** and/or the measurement and control unit **84** preferably include a logger to store the data and measurements taken by measurement and control unit **84**. The logger interfaces with the communication system **138**. The communications system **138** receives the data from the communication module **64** and then transmits the data remotely to the server **142**. The communication system **138** preferably includes antenna **89** that communicates with one of the communicators such as satellite **144**, cellular phone **146**, or radio **148**. U.S. Provisional Patent Applications Serial Nos. 60/128,513 and 60/129,708 each filed Apr. 7, 1999 and entitled "Remote Data Access and System Control" and U.S. patent application Ser. No. _____, filed Apr. 7, 2000, entitled "Remote Data Access and System Control", all hereby incorporated herein by reference, disclose an example communication system.

[**0131**] Once the data has been transmitted back to the server **142**, the data is then accessed through the Internet **150**. The measurements are collated with a particular time such that a database is produced for each individual cathodic protection circuit **20** as well as the pipeline **10**. Each rectifier has its own unique identification such that a communication system **138** receives data from approximately 50 different operating units, the data is collected, and then transmitted to a central station which is then picked up by the server. The server is able to identify each of the data packages associated with each of the remote operating units.

[**0132**] There is two-way communications between the remote monitoring unit and the server **142**. The communication back to the monitoring unit may merely be an acknowledgement of the receipt of the transmission of the data. However, it should be appreciated that control functions can also be communicated and performed. For example, the time period within which measurements are to be taken may be altered remotely. Further, with two-way communication, a remote operating unit may be turned off during an electrical disturbance. The system can also include